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NOTES ON GEOGRAPHIC DISTRIBUTION

Mollusca, Gastropoda, Heterobranchia, Ancylidae, *Gundlachia radiata* (Guilding, 1828): First record of occurrence for the northwestern region of Argentina

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ABSTRACT: In the present paper we report for the first time the presence of *Gundlachia radiata* (Guilding, 1828), in northwestern region (Jujuy province), Argentina. Adult and juveniles specimens of this freshwater limpet were collected in two temporary water bodies. This record represents the first report of this species in Argentina but also is the southernmost point of occurrence of *G. radiata* in South America. As a result, the distributional range of this species is increased and the species richness of Ancylidae in Argentina is incremented to a total of seven species classified in four genera.

The Ancylidae *sensu latum* are freshwater pulmonate snails, characterized by a pateliform shell. Ancylidae are cosmopolitan, and according to Santos (2003) there are seven genera in South America: *Anisancylus* Pilsbry, 1924; *Gundlachia* Pfeiffer, 1849; *Hebetancylus* Pilsbry, 1913; *Uncancylus* Pilsbry, 1913; *Burnupia* Walker, 1912; *Ferrissia* Walker, 1913 and *Laevapex* Walker, 1903. Distributional data as well as the systematic position of Argentinean Ancylidae are scarcely known with only few species records for this country.

In this paper, we report the first record of occurrence of *Gundlachia radiata* (Guilding, 1828) (Figure 1) in northwestern Argentina. This report is based on the discovery of specimens collected in two small temporary water bodies extending the geographic distribution of this species to the subtropical region (Figure 2).

Nowadays, the genus *Gundlachia* comprises six nominal species distributed in South America: *G. bakeri* Pilsbry, 1913; *G. lutzi* Walker, 1925; *G. radiata* (Guilding, 1828); *G. saulcyana* (Bourguignat, 1853), *G. ticaga* (Marcus & Marcus, 1962) and *G. leucaspis* (Ancey 1901) (Lanzer 1996; Santos 2003).

Although in Argentina previous records from the literature mentioned the presence of the genus *Gundlachia*, they are in fact related to *Uncancylus concentricus* (d'Orbigny 1835) and *Hebetancylus moricandi* (Pilsbry 1924) in northeast Argentina and Patagonian regions. *Uncancylus concentricus*, under the synonyms *Gundlachia nordenskioldi* Pilsbry, 1924, *G. concentrica* and *G. concentrica bonariense* Strobel, 1874, were described from Corrientes Province (Hylton-Scott 1953). *Gundlachia moricandi* is a synonym of *H. moricandi* and together with *U. concentricus* has a wide distribution from northern Argentina (Misiones, Corrientes, Entre Ríos, Formosa, Chaco, Salta and Santiago del Estero), to Santa Fe, Buenos Aires and Northern Patagonia (Castellanos 1982; Castellanos and Landoni 1995; Rumi *et al.* 2008).

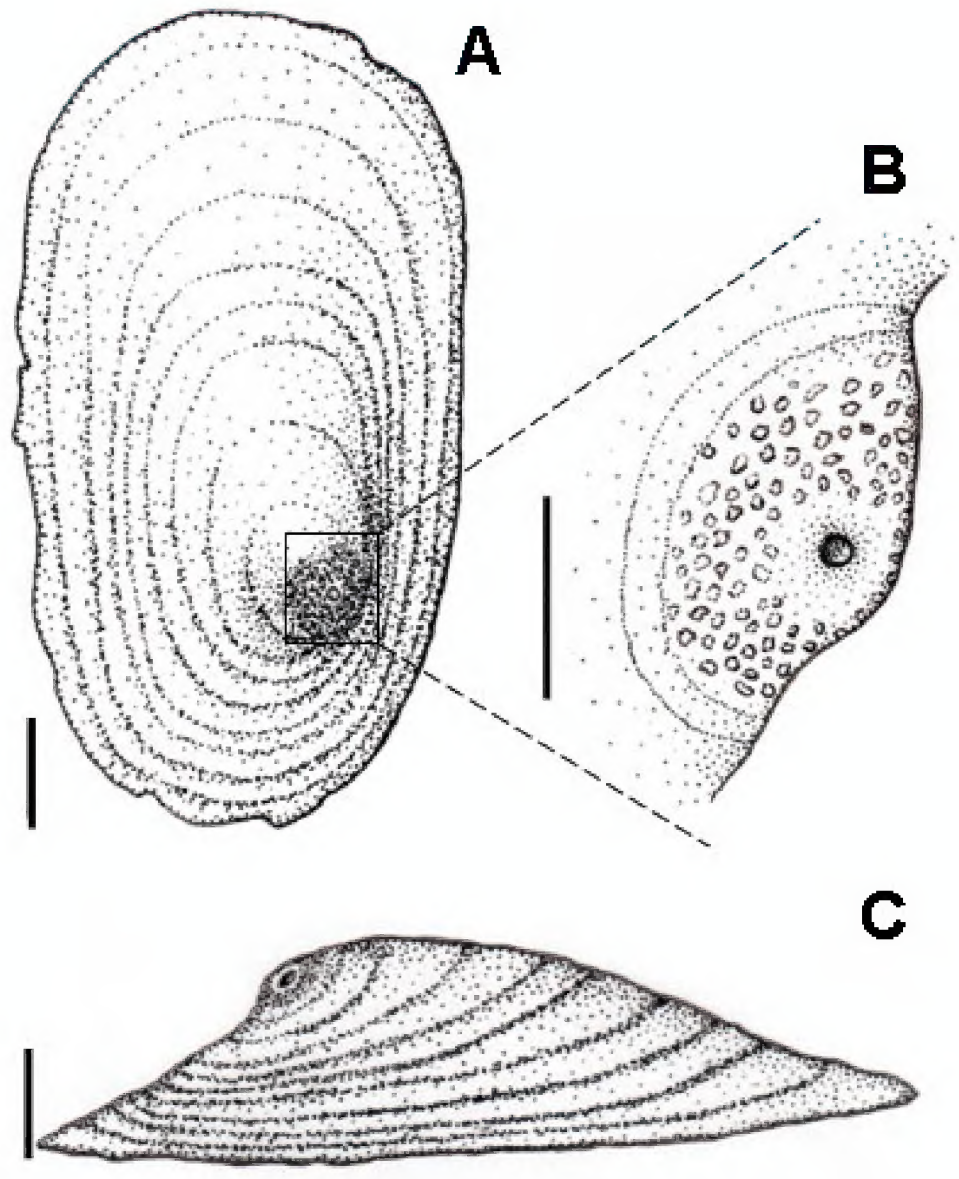

FIGURE 1. *Gundlachia radiata*. Drawings of shell (Mol UERJ 7841). (A) Dorsal view, (B) apical microsculpture with irregular punctuations and (C) left lateral view Scale = 1 mm.

Considering the statement above, the first record of the genus *Gundlachia* for Argentina is from Lanzer (1996) who cited *G. ticaga* to Misiones and Corrientes Province. Gútierrez Gregoric *et al.* (2006) confirmed the record of *G. ticaga* for Misiones province. Recently, Rumi *et al.* (2008) also mentioned *G. ticaga* with a "continuous restricted distribution" in Argentina but without giving the exact distributional area where it was found.

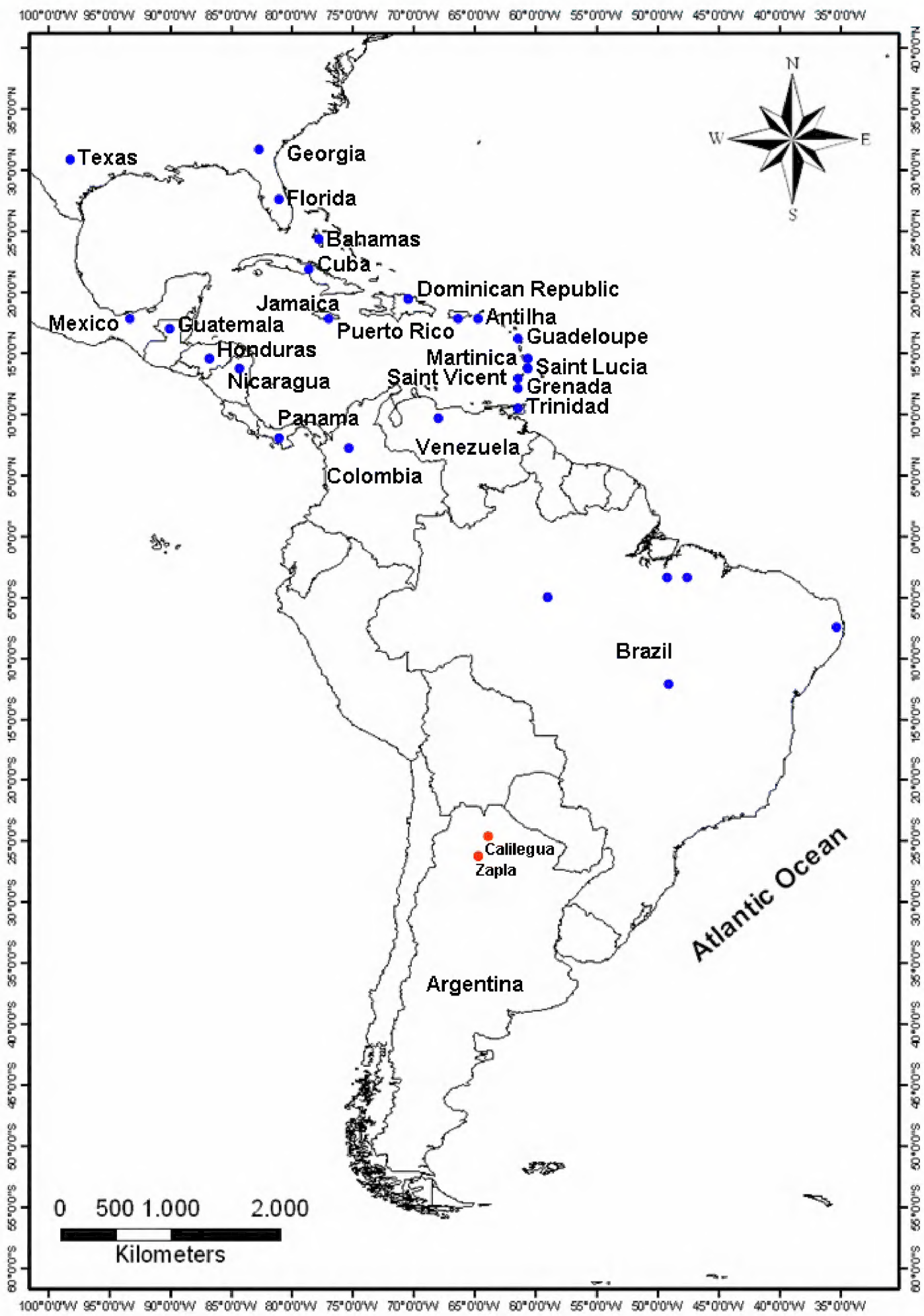

FIGURE 2. *Gundlachia radiata*. (A) Distribution map in the Americas, indicating the previous known locality (blue circles) and the new records (red circles).

Concerning *G. radiata* its current distribution ranges from southern United States to north and northern South America, with references to Texas (Basch 1963), Georgia and Florida (Basch 1963; Hubendick 1967); Central America: Antigua (*apud* Lanzer 1996), Bahamas (Hubendick 1967), Barbados (Schomburgk 1848), Costa Rica (Hubendick 1967), Cuba (Aguayo 1938, Hubendick, 1967), Dominican Republic (Malek 1985), Grenada (Harrison 1983), Guadeloupe (Hubendick 1967, Pointier 1976), Guatemala (Walker 1917, Goodrich and van der Schalie 1937, Hubendick 1967), Honduras (Pfeiffer 1858), Jamaica (Walker 1921, Hubendick 1967), Martinique (Aguayo 1966), México (Hubendick 1967), Nicaragua (Tate 1870, Hubendick 1967, Lanzer 1996, Thompson 2008), Panama (Zetek 1918), Puerto Rico (Harry and Hubendick 1963, Hubendick 1967), Saint Lucia (Harrison 1983), Saint Vincent (Harrison 1983) and Trinidad (Smith 1896); South America: Colombia (Hubendick 1967), Venezuela (Hubendick 1967) and in Brazil, it is found at north and northern regions (Irmler 1975; Lanzer 1996; Santos 2003) and recently the species was found at the central-western Brazilian region (Thiengo *et al*. 2005), extending its southernmost geographic range (Figure 2).

Lack of studies concerning to occurrence, systematic and distribution of Ancylidae, particularly in Argentinean northwestern region (NOA), has led to field work in different NOA localities.

Field work was carried out on May 2009 in small and temporary water bodies in Jujuy province (Argentina). Field works were conducted under appropriate legal authorization. These water bodies are originated by precipitation. Specimens of *G. radiata* were found with both shells forms, with and without septum.

One of the water bodies was located on the edge of the

Route 34 on the road to Calilegua (23°33'43" S, 64°23'33" W) (Figure 3A). The second one was located in Zapla (24°13'10.2" S, 65°06'3.9" W) within an eucalyptus forest (Figure 3B). The specimens were found on sand banks surrounded by vegetation. The material was obtained through the examination of riparian and floating vegetation, with the help of fine mesh sieves. Most specimens were found attached to aquatic vegetation, branches and leaves of eucalyptus and grasses obscured by aging.

Figure 3. Temporary ponds inhabited by *Gundlachia radiata* in the province of Jujuy, Argentina. (A) Edge of the Route 34 on the road to Calilegua, (B) Zapla. Photos: Eduardo Dominguez.

The material was analyzed in the Malacological Laboratory of the Miguel Lillo Foundation (UNT-Tucumán). The identification of the specimens was conducted following Santos (2003) using morphological and morphometric characters (shell shape and size, teleoconch and protoconch microsculpture, mantle color pattern and pattern of muscular scars). Out of 260 specimens, 117 presented septate shells on different stages of development (Figure 4). The shell shape was elliptical with periostracum pale color. Left side of shell is more projected than right one, apex irregularly punctuate (Figure 1) similar to Hubendick´s (1967) description. The average measurements obtained (mm) from the shells and their ranges of values (maximum-minimum, standard deviation) were, 7.56 (10.3-6.5, 1.54) length, 3.79 (5.9-3.0, 1.0) width and 2.08 (2.6-1.2, 0.51) height. The adhesive area is well marked and elongated and the anterior right muscle scar is more or less elliptical with a slight curvature in the inner portion (Figure 5A). The mantle pigmentation is scarce, concentrated in the anterior side (Figure 5A). Almost 50% of the collected specimens of *G. radiata* were septated ancyliform shells in shape (Figure 4 and 5B), reflecting the adverse habitat conditions (temporary ponds). The physical-chemical parameters (pH 5 and low conductivity 36.5 µS/cm) registered in each temporary ponds support, even more, the idea that the development of the septum is in response to unfavorable environmental conditions. The presence of the septum would let keeping the water in the body, thereby, increasing the possibilities of survival of the species (Aguayo 1946; Hylton-Scott 1953; Richardot 1974; Santos 2003).

This record is the southernmost of *G. radiata* to South America and the first to Argentinean northwestern region, extending the geographic distribution of the species and increasing the list of freshwater snails to Argentina from six (Rumi *et al.* 2008) to seven (Figure 2).

The specimens were deposited at the Malacological Collection of the Miguel Lillo Institute (IML 15291, IML 15292 A, IML 15298 A, IML 15299), Tucumán province, Argentina. Specimens used to soft parts illustration were inserted into the Malacological Collection of the Universidade do Estado do Rio de Janeiro (Mol. UERJ 7841).

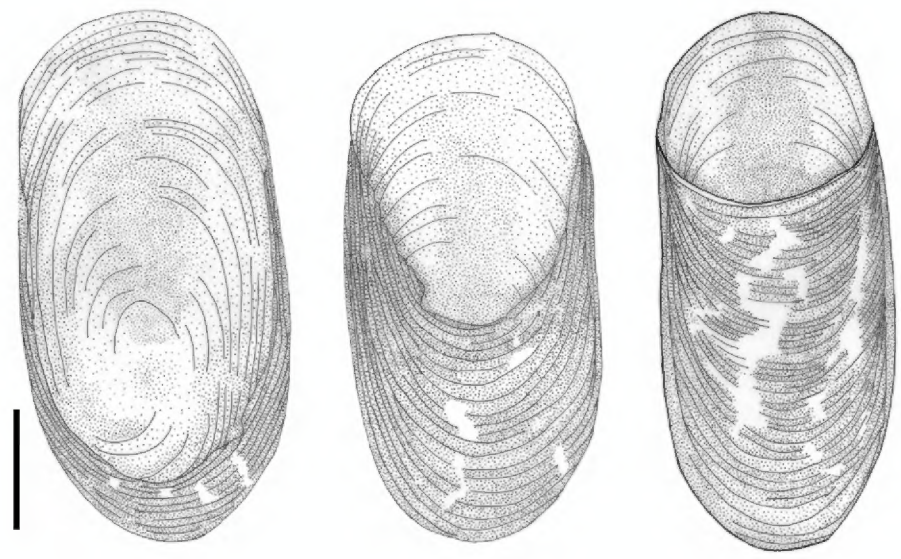

Figure 4. *Gundlachia radiata*. Drawings of shells (IML 15299) with septum on different stages of development.

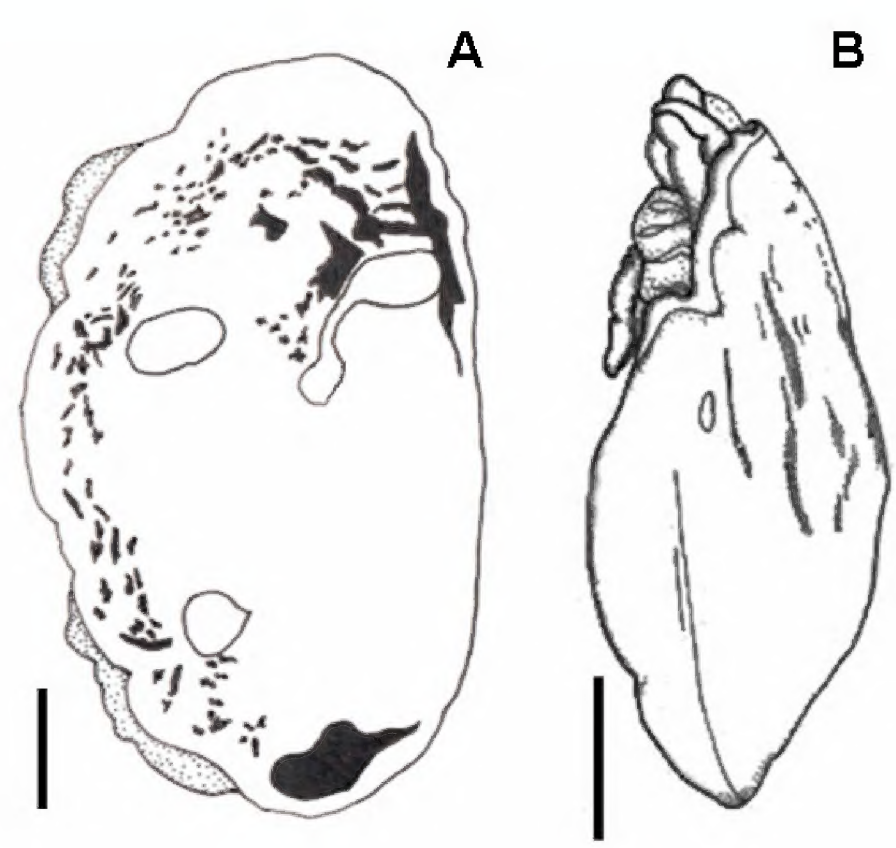

Figure 5. *Gundlachia radiata*. Drawings of animal. (A) mantle color pattern and muscular scars (Mol. UERJ 7841); (B) ancyliform form in left lateral view showing mantle modification (IML 15298 A). Scale = 1 mm.

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